

for this remark. On December 21, according to Halley's elements, the distance of the comet from the earth was only 0.14; on January 3 it had increased to 0.42.

The fact that the place of the ascending node of the comet of 1698, as it is printed in Halley's "Synopsis of Cometary Astronomy," is 180° in error, or, in other words, the place of the descending node has been given for that of the opposite one, furnishes a hint that it is not safe to accept a single calculation of the orbit of any of the earlier-computed comets without examination.

ASTRONOMICAL PHENOMENA FOR THE WEEK, 1885, AUGUST 30 TO SEPTEMBER 5

(For the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on August 30

Sun rises, 5h. 11m.; souths, 12h. 0m. 23' os.; sets, 18h. 49m.; decl. on meridian, 8° 52' N.; Sidereal Time at Sunset, 17h. 26m.

Moon (at Last Quarter on Sept. 2) rises, 20h. 28m.*; souths, 3h. 15m.; sets, 10h. 12m.; decl. on meridian, 8° 11' N.

Planet	Rises h. m.	Souths h. m.	Sets h. m.	Decl. on meridian
Mercury ...	6 1 ...	12 17 ...	18 33 ...	2 28 N.
Venus ...	8 7 ...	13 57 ...	19 47 ...	2 47 S.
Mars ...	0 36 ...	8 48 ...	17 0 ...	22 50 N.
Jupiter ...	5 48 ...	12 28 ...	19 8 ...	7 6 N.
Saturn ...	23 43* ...	7 52 ...	16 1 ...	22 25 N.

* Indicates that the rising is that of the preceding day.

Occultations of Stars by the Moon

Sept.	Star	Mag.	Disap.	Reap.	Corresponding angles from ver- tex to right for inverted image
			h. m.	h. m.	
1 ...	6 ^h Tauri ...	4 ¹ ...	22 1 ...	22 52 ...	62 247
1 ...	6 ^h Tauri ...	4 ¹ ...	22 2 ...	22 51 ...	82 227
1 ...	B.A.C. 1391 ...	5 ...	23 1 ...	23 32 ...	117 189
1 ...	81 Tauri ...	5 ¹ ...	23 9 near approach	333 —	
1 ...	85 Tauri ...	6 ...	23 21 ...	0 14 ...	20 284
2 ...	Aldebaran ...	1 ...	1 40 near approach	154 —	
2 ...	117 Tauri ...	6 ...	22 34 ...	23 20 ...	84 221
3 ...	B.A.C. 1728 ...	6 ...	0 13 ...	0 48 ...	9 288
4 ...	26 Geminorum ...	5 ¹ ...	4 57 near approach	146 —	
5 ...	68 Geminorum ...	5 ¹ ...	0 58 near approach	323 —	

† Occurs on the following day.

The Occultations of Stars are such as are visible at Greenwich.

Sept.	h.	
2 ...	18 ...	Mercury in inferior conjunction with the Sun.
4 ...	3 ...	Saturn in conjunction with and 4° 17' north of the Moon.
5 ...	7 ...	Mars in conjunction with and 5° 33' north of the Moon.

GEOGRAPHICAL NOTES

SAD news has been received from the Dutch African Expedition; its leader, Mr. D. D. Veth, died from disease on May 19, in the camp on the banks of the Kala-Kanga River, between Benguela and Humpata. This is a real loss for science as well as to his venerable father, Prof. P. J. Veth, who has given his whole industrious life to scientific work.

THE Austrian Government, with the consent of the Porte, has undertaken to make a geographical survey of the Albanian coast, with a view to preparing new maps. Two Austrian gunboats have accordingly left for Corfu with officials of the Chart Department on board. Here they will be joined by the Turkish officers, under whose superintendence the survey will be made.

It is stated in the latest *Ergänzungsheft* to *Petermann's Mittheilungen*, that there are in Peking four institutions at which astronomical and meteorological observations have been made for a number of years: (1) the Chinese Observatory, called *Kuan sanz tai*, which has existed for about six centuries. In 1674 the Jesuits provided it with new astronomical instruments, without lenses, which are well preserved to this day. It is situated on the eastern wall of the Manchu town. (2) Bethang, or the

Northern Church, the *Collegium Gallorum*, near the Imperial palace. Here in the middle of the eighteenth century the Jesuits erected an observatory, and made many astronomical observations, amongst them the transit of Venus of June 3, 1769. Besides these Père Amiot made meteorological observations for six years, from 1757 to 1762. (3) The Russian Legation, near the southern wall of the Manchu town. The astronomer Fuss, who made a great journey between 1830 and 1832 from St. Petersburg to Eastern Siberia, and by Kiachta to Peking, at the orders of the Academy of Sciences of St. Petersburg, spent seven months here, and organised astronomical, geographical, magnetic, and meteorological observations. (4) Beguan, about 300 metres from the north-eastern corner of the wall surrounding the Manchu city. Here the members of the Russian missionary body, and the native Christians under their direction, carried out a series of magnetic and meteorological observations between 1841 and 1860. In 1864 this Observatory was separated from the missionary establishment, and in 1867 the St. Petersburg Academy of Sciences selected Dr. H. Fritsche for its director, a position which he held for sixteen years. For twelve of these he lived in Peking, while the other four were spent for the most part in journeying through the Chinese Empire and Siberia, in order to inspect the meteorological stations and the three magnetic observatories at Ekaterinburg, Barnaul, and Nerchinsk, to establish new stations, and specially to obtain astronomical, geographical, and hypsometric observations in as large a number of places as possible. His investigations into the meteorology of Eastern Asia were published by the Academy in 1877, and he now publishes in the *Ergänzungsheft* above alluded to the results of his sixteen years' observations in other departments. He describes his numerous journeys in China, Mongolia, and Manchuria, and gives a mass of data with regard to the latitude and longitude of places, and their heights above the sea-level. There are also, in the second part of the paper, a large number of measurements connected with earth magnetism. The title of the paper, which is a long one, and represents a vast amount of travel and labour, is "Ein Beitrag zur Geographie und Lehre vom Erdmagnetismus Asiens und Europas," von Dr. H. Fritsche, *Petermann's Mittheilungen Ergänzungsheft*, No. 78.

IN the current number of *Petermann's Mittheilungen* the principal article is an account, historical and geographical, of "a lava desert in the interior of Iceland," and the largest lava area in Europe. The "desert" in question is situated in that part of the plateau in the interior which lies between the Vatnajökull and the rivers Skjálfandafljót and Jökulsá. It is known to the inhabitants of the neighbouring coasts as Odáðahraun. The author, Th. Thoroddsen, describes his journey from Myvatn in detail.—Prof. Nell explains Fischer's perspective projection for maps, and gives a map of Asia on this system; while Herr Flegel describes his journey in 1879 with the Henry Venn expedition up the Pico Grande from the Cameroons.

THE *Zeitschrift* of the Gesellschaft für Erdkunde at Berlin (Band 20, Heft 3) is almost wholly occupied with an account by Herr Schmidt of the travels of the friar Rubruk between 1253 and 1255 into the heart of Central Asia, and to the borders of China. This remarkable journey is described and explained with much painstaking learning. The only other contribution to the number is a table of lengths of the principal Russian rivers from General Tillo's survey.

FROM the latest reports the Australian New Guinea expedition appears to have progressed satisfactorily so far. The Government of Queensland had offered to hold frequent communication with the party by means of the steamer *A luanee*, with a view of obtaining information of the progress of the work of exploration. A branch of the Geographical Society of Australasia is to be formed at Brisbane.

A PARLIAMENTARY blue-book (Corea, No. 3, 1885) lately published contains the report of a journey made by Mr. Carles, the Vice-Consul at Seoul, from that place to Phýng Kang, where some gold mines exist. These lie to the west of the main road between Seoul and Gensan, and were stated to be of greater extent than any existing in Corea. They are in the Phýng Kang district, in the neighbourhood of the town of Pai-namou-tjang, about 100 miles from the capital. Part of the road lay across a vast lava-field, which appears to exceed in extent even the largest in Iceland. Between Chhöl-wön and Pai-namou-tjang, a distance of 40 miles, there is only one break in its bed, which Mr. Carles attributes to the action of

the stream which flows near Ph्योंg Kang; the uniform depth of the lava is about 100 to 140 feet, and it has a continuous and gradual ascent towards the north. Local statements as to its extent beyond Pai-namou-tjang were vague, but the plain could be seen stretching 13 miles farther up the divide of the eastern and western watersheds. Twenty miles north of this divide Mr. Carles left a similar plane last year, stretching from An-byön to Kosan, but nearly 1000 feet below the level of the present plain. There are thus three great oval fields of lava passing almost in a straight line through the mountain chain which runs from the north to the south of Corea at a height of about 1500 feet above the sea near the divide, and of 500 feet in the lower levels. There is also another plain about 4 miles wide and 12 miles long to the east in Keum-söng district, the direction of which is not so well defined, but in which the depth of lava is apparently even greater than that in the others. No crater is visible in any direction to account for the enormous mass of lava; no hot springs were heard of within 30 miles, and sulphur is said to be imported from China, so that the gigantic overflow would appear to have taken place in the valley, and to have completely buried the volcano from which it came, if such were its source. At the first gold-washing visited about 270 men were said to be employed. Trenches were being dug in a bed of shingle by the river-side, and being driven parallel with the course of the stream. The men worked in parties of six, with one washer, who managed his wooden bowl very cleverly. Only small particles of gold are found, but the results seemed uniform and far superior to those of any other place visited by Mr. Carles in Corea. At two different washings which he witnessed, and which were said to give about the average yield, three basins of good earth, representing less than an hour's labour of six men, produced about fifteen pieces of gold—small indeed, but clearly visible at three yards' distance. Farther up the valley, where the men were working in smaller gangs, the yield was about the same in proportion to the number of men. On the western slope are other workings, where some 300 men are engaged, but these do not appear to be so productive. It appears that this valley has never before been worked for gold; in other places it has been sought for ages, and always found after the summer floods had brought down fresh detritus; but here the shingle seemed never to have been disturbed, or, rather, arranged in walls, before. The country here also seemed more promising than elsewhere, and to be worth the visit of an experienced miner.

For many years it was believed that the highest mountain in Sweden was Sulitjelma, on the frontier between Sweden and Norway, the height of which is about 6000 feet. A couple of years ago it was, however, discovered that the mountain of Sarjektjåkko, in Swedish Lappland, was a thousand feet higher. Lately, Dr. Svenonius, well known for his explorations of this province, has declared that neither of these mountains is the highest in Sweden, the honour belonging to Kebnekaise, another peak in the same province, which the topographical surveyor of the province of Norrland has measured and found to be 7192 feet in height.

ACCORDING to recent advices from the Faroe Islands, a well-known landmark has disappeared there, viz. the rock called "the Monk," situated about five miles south of Sumbö. Its height was nearly 100 feet. On the top of it lay some large boulders, which could be seen distinctly. Already last year part of the top fell down, but the body remained until last winter or this spring, when its disappearance was discovered.

MINERAL PRODUCTS OF THE UNITED STATES

THE second Report on "The Mineral Resources of the United States," by Albert Williams, jun., Chief of the Division of Mining Statistics and Technology, United States Geological Survey, is now in press and will be issued shortly. This Report is for the calendar years 1883 and 1884, and contains detailed statistics for these periods and also for preceding years, together with much descriptive and technical matter. The following are the totals of the production of the more important mineral substances in 1884:—

Coal.—The only statistics in which the trade is interested are those relating to the amount of coal which is mined for and reaches the market. There is, besides, a local and colliery consumption which is usually disregarded in statistics, and which

ranges from 5 to 6½ per cent. of the total shipments. Of what may be called the commercial product the quantities in 1884 were as follows:—Pennsylvania anthracite, 30,718,293 long tons; bituminous and brown coal, lignite, and small lots of anthracite mined elsewhere than in Pennsylvania, 66,875,772 long tons; total, 97,594,065 long tons. The spot value of the commercial product was: Pennsylvania anthracite, \$61,436,586; bituminous and all other coals, \$70,219,561; total, \$131,656,147. Including the local consumption, &c., the total product in 1884 may be stated at 106,906,295 long tons—namely, 33,175,756 long tons of Pennsylvania anthracite and 73,730,539 long tons of bituminous and all other coals; and the value at the mines was: Pennsylvania anthracite, \$66,351,512; bituminous and all other coals, \$77,417,066; total, \$143,768,578. The total production (that is, including colliery and local consumption) of anthracite was 1,160,713 long tons less than in 1883, while its value was \$10,905,543 less, the disproportionate decline in value being due to a fall of 25 cents. per ton in spot price (\$2.25 to \$2). The total bituminous coal production increased 5,199,039 long tons over that of 1883, but its value was \$4,820,734 less, the average valuation at the collieries having fallen from \$1.20 to \$1.05. The total output of all coals showed a net gain in tonnage of 4,038,326 long tons, and a decline in value of \$15,726,277.

Coke.—There were 4,873,805 short tons of coke made in 1884, worth \$7,242,878 at the ovens. This production consumed 7,951,974 short tons of coal. The amount of coke made was 590,916 tons less than in 1883, and the value was \$878,729 less.

Petroleum.—The production of crude petroleum in 1884 was 24,089,758 barrels of 42 gallons each, of which the Pennsylvania and New York oil-fields produced 23,622,758 barrels. The total value, at an average spot price of 85 cents, was \$20,476,294. As compared with 1883 the production was 689,529 barrels greater; but the total value was \$5,263,958 less, the average spot price having fallen from \$1.10, or 25 cents per barrel.

Natural Gas.—The estimated value of the natural gas used in the United States in 1884 was \$1,460,000, as against \$475,000 in 1883. The value is computed from that of the coal superseded by natural gas.

Iron.—The principal statistics for 1884 are as follows:—Iron ore mined, 8,200,000 long tons; value at mine, \$22,550,000. Domestic iron ore consumed, 7,718,129 long tons; value at mine, \$21,224,854. Imported iron ore consumed, 487,820 long tons; total iron ore consumed, 8,125,949 long tons. Pig iron made, 4,097,868 long tons—a decrease of 497,642 tons as compared with 1883; value at furnace, \$73,761,624, or \$18,148,576 less than in 1883. Total spot value of all iron and steel in the first stage of manufacture, excluding all duplications, \$107,000,000, a decline of \$35,000,000 from 1883. Fuel consumed in all iron and steel works, including blast furnaces, 1,973,305 long tons of anthracite, 4,226,986 long tons of bituminous coal, 3,833,170 long tons of coke, and 52,110,660 bushels of charcoal, besides a notable quantity of natural gas. Limestone used as flux, 3,401,930 long tons; value at quarry, \$1,700,965.

Gold and Silver.—The mint authorities estimate the production in 1884 at \$30,800,000 gold and \$48,800,000 silver (coinage rate); total, \$79,600,000. This was an increase of \$800,000 gold and \$2,600,000 silver as compared with 1883. The gold production was equivalent to 1,489,949 troy ounces, and the silver to 37,744,605 troy ounces.

Copper.—The production in 1884, including 2,858,754 pounds made from imported pyrites, was 145,221,934 pounds, worth \$17,789,687, at an average price of 12½ cents per pound in New York City. The amount was 28,070,139 pounds greater than the production of 1883; but the value was \$275,120 less than that for 1883, owing to the decline in price. In 1884 4,224,000 pounds of bluestone (sulphate of copper, "blue vitriol") were made; worth, at 4½ cents per pound, \$181,632.

Lead.—Production, 139,897 short tons. Total value, at an average price of \$75.32 per ton on the Atlantic sea-board, \$10,537,042. The production was 4060 tons less than that of 1883, while the decrease in value was \$1,785,677. The production of white lead (carbonate) is estimated at about 65,000 short tons, worth, at 4½ cents per pound, \$6,337,500, almost all of which was made from pig lead. The production of litharge and red lead has not been ascertained.

Zinc.—Production of metallic zinc, 38,544 short tons; worth, at an average price of 4¼ cents per pound in New York City, \$3,422,707. The output was 1672 tons greater than in 1883,